

Objective: Students will be able to **multiply** and **divide** rational functions.

Talk to your group:
What will the graph of the function

$$f(x) = \frac{3x + 5}{x + 3}$$

look like?
NO CALCULATORS!

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$$f(x) = \frac{3x+5}{x+3}$$

Verify with your calculator. Were you correct?

*What's
happening?*

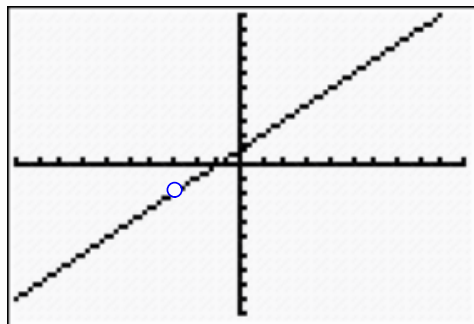


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What do you expect the function below to look like?

$$f(x) = \frac{x^2 + 4x + 3}{x + 3}$$

Graph it on your calculator.
Are you surprised?



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The function below looks like a line,
because it can be **SIMPLIFIED!**

$$f(x) = \frac{x^2 + 4x + 3}{x + 3}$$

What is up with
the hole?

**When we multiply and divide
rational expressions,
we will need to simplify to
truly know what the graph is
going to look like!**

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$$\frac{2}{5} \cdot \frac{7}{3}$$



If you know how to multiply fractions, then you know how to multiply rational expressions....

rational expressions ARE fractions.

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$$\frac{x+4}{x+5} \cdot \frac{x-7}{x-3} \quad \text{TRY IT!}$$

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$$\frac{x+8}{x-3} \cdot \frac{x-3}{x+2}$$

TRY IT!

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Those were about a level 2...

$$f(x) = \frac{2x^2 + 7x + 3}{3x^2 + 17x + 10} \cdot \frac{3x^2 + 5x + 2}{x^2 - x - 6}$$

TRY IT! (definitely not a level 2)



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Oh my...

How about this one?

$$g(x) = \frac{2x^2 + 4x - 6}{3x^2 - x - 10} \div \frac{2x^2 - 6x - 4}{x^2 - 3x - 2}$$

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You have got to be kidding me...



$$g(x) = \frac{\frac{2x^2+4x-6}{3x^2-x-10}}{\frac{2x^2-6x-4}{x^2-3x-2}}$$

How is this one different?

Practice Problems

$$1. \frac{5x-1}{x^2-x-2} \cdot \frac{(x-2)^2}{x-3}$$

$$2. \frac{3x^2-10x+3}{x^2-4} \div \frac{3x^2+x-1}{x+2}$$

$$3. \frac{x^2-x-6}{x^2+7x+10} \cdot \frac{x^2-2x-35}{x^2-2x-3}$$

$$4. \frac{\frac{2x^2+3x-2}{3x}}{\frac{x^2-3x-10}{3x^2+9x}}$$

$$5. \frac{3x^2-x-2}{x^2+4x+3} \cdot \frac{x^2-1}{x^2+4x-5}$$

$$6. \frac{(x-2)^2}{x^2+4x+3} \div \frac{x^2+x-6}{(x+3)^2}$$

$$7. \frac{2x^2+5x-12}{3x^2-7x+4} \cdot \frac{4x^2-4x}{8x^2-12x}$$

$$8. \frac{\frac{4x^2-1}{2x^2+9x+4}}{\frac{x^2+2x-24}{x^2+x-12}}$$

$$9. \frac{x^2-9}{x-5} \cdot \frac{3x^2-16x+16}{x^2-x-12}$$

$$10. \frac{2x^2-9x-18}{x^2+3x-4} \div \frac{2x^2-5x-12}{x^2+10x+24}$$

$$11. \frac{x^2+x-12}{2x^2-3x-9} \cdot \frac{4x^2-9}{x^2+6x+5}$$

$$12. \frac{\frac{5x^2-x-6}{x^2+3x-4}}{\frac{5x^2-16x+12}{x^2-x-20}}$$

$$13. \frac{3x^2+x-4}{4x^3+4x^2} \cdot \frac{4x^2}{x^2-7x+6}$$

$$14. \frac{x^2+6x-7}{4x^2+9x+2} \div \frac{x^2-6x+5}{12x+3}$$

$$15. \frac{x+4}{x-3} \cdot \frac{x^2-9}{x^2-x-2}$$

$$16. \frac{6x^2+7x-10}{x^2+6x-7} \div \frac{6x^2-29x+20}{x^2+3x-28}$$

Homework 8.3 #17-23, odd & #29-35, odd
and #45 and create your own multiplication
or division problem.